The Claims

What is claimed is:

1. An apparatus comprising:

a pulse source including,

a pulse generator for generating a pulse of photons;

a parametric down-converter for receiving said pulse of photons, wherein photons that make up a portion of said pulse of photons are each parametrically down-converted into first and second photons, in which said first and second photons being such that alteration of a characteristic of one of said first and second photons alters a corresponding characteristic in the other of said first and second photons;

a transmitter for receiving said first photons from said pulse source, said transmitter including a collapse event device for selectably altering said characteristic of said first photon; and

a receiver for receiving said second photons from said pulse source, said receiver having a detector to detect alteration of said characteristic of said second photon wherein said receiver includes a nonlinear element for enhancing said detection.

2. The apparatus of claim 1 wherein said first photon is an idler photon and wherein said second photon is a signal photon.

3. The apparatus of claim 1 wherein said pulse generator is a laser.

4. The apparatus of claim 1 wherein said parametric down-converter is a nonlinear crystal.

5. The apparatus of claim 4 wherein said nonlinear crystal is a Beta Barium Borate crystal.

6. The apparatus of claim 1 wherein said idler photons have a frequency and wherein said collapse event device of said transmitter includes a frequency measurer.

7. The apparatus of claim 6 wherein said frequency measurer includes a spectrometer.

8. The apparatus of claim 1 wherein said receiver includes at least one photon detector.

9. The apparatus of claim 1 wherein said nonlinear element of said receiver includes dispersive glass.

10. The apparatus of claim 1

wherein said parametric down-converter further provides photons, that make up another portion of said pulse of photons, that are non down-converted; and

wherein said receiver receives said non down-converted photons to correspond said

second photons received by said receiver with said pulse of photons.

11. An apparatus comprising:

a pulse source including,

a laser for generating a pulse of photons,

a nonlinear crystal parametric down-converter for receiving said pulse of photons, said parametric down-converter providing non down-converted photons from said pulse of photons and parametrically down-converted signal and idler photons from said pulse of photons, said signal and idler photons each having a center wavelength;

a transmitter for receiving said idler photons from said pulse source, said transmitter including a spectrometer for selectably measuring a frequency of said idler photons, said measuring of said frequency providing an alteration to a majority of said idler photon center wavelengths; and

a receiver for receiving said signal photons from said pulse source and for receiving said non down-converted photons from pulse source to correspond said signal photons to said pulse of photons, said receiver having a detector for detecting alteration of said center wavelengths of said signal photons, wherein said detector includes at least one photon detector and a nonlinear element for enhancing detection of said alteration of said center wavelength of said signal

photons as received by said receiver.

12. The apparatus of claim 11 wherein said nonlinear crystal includes a Beta Barium Borate crystal.

13. The apparatus of claim 11 wherein said nonlinear element includes dispersive glass.

14. A method comprising:

projecting a pulse of photons through a parametric down-converter wherein photons that make up a portion of said pulse of photons are each parametrically down-converted into first and second down-converted photons, said first and second down-converted photons each having a center wavelength;

projecting said first down-converted photons to a receiver;

projecting said second down-converted photons into an atmosphere wherein most of said center wavelengths of said second down-converted photons are altered if said second photons encounter a collapse condition in said atmosphere, said collapse condition causing a corresponding change in said center wavelengths of said first down-converted photons as received at said receiver, and wherein said center wavelengths of said second down-converted photons are left unaltered if said second down-converted photons do not encounter said collapse condition in said atmosphere, leaving said center wavelengths of said first down-converted photon as received at said receiver unaltered; and

detecting whether said center wavelengths of said first down-converted photons as received at said receiver have been altered, said step of detecting including projecting said first down-converted photons through a nonlinear element.

15. The method of claim 14 wherein said first down-converted photon is a signal photon and wherein said second down-converted photon is an idler photon.

16. The method of claim 14 wherein said parametric down-conversion occurs by projecting said pulse of photons through a non-linear crystal.

17. The method of claim 16 wherein said nonlinear crystal is a Beta Barium Borate crystal.

18. The method of claim 16 wherein said down-conversion in said nonlinear crystal occurs via colinear, non-degenerate, type I phase-matching.

19. The method of claim18 wherein said nonlinear crystal includes a Beta Barium Borate crystal.

20. The method of claim14 wherein said second photon has a frequency and wherein said collapse condition occurs when a measurement of said second photon frequency is made.

21. The method of claim14 wherein said second photon has a frequency and wherein said atmosphere includes a transmitter wherein a measurement of said second photon frequency is made.

22. The method of claim 21 wherein said frequency measurement includes using a spectrometer.

23. The method of claim14 further including the step of using a laser to project said projected pulse of photons through said parametric down-converter wherein said parametric down-converter is a nonlinear crystal.

24. The method of claim14 wherein purposeful causation of said collapse condition and a lack of purposeful causation of said collapse condition are used for communication.

25. The method of claim14 wherein sensing of said atmosphere is performed by equating changes in said center wavelength of said first photon with collapse condition changes in said atmosphere.

26. The method of claim 14 wherein said step of projecting said first down-converted photons through said nonlinear element includes projecting said first down-converted photons through dispersive glass.

27. A method comprising:

projecting a pulse of photons through a nonlinear crystal, wherein photons that make up a portion of said projected pulse are each parametrically down-converted into a signal and idler photon pair, said portion resulting in a series of signal photons and a series of idler photons, and wherein photons that make up another portion of said projected pulse are non down-converted, resulting in a series of non down-converted photons corresponding to said projected pulse;

projecting to a receiver said series of signal photons and said series of non down-converted photons;

projecting to a transmitter said series of idler photons, said transmitter having a collapse condition path wherein a majority of center wavelengths of said idler photons is altered, resulting in a corresponding change in a majority of center wavelengths of corresponding signal photons as received at said receiver, and a non-collapse condition path wherein said center wavelengths of said idler photons are left unaltered and wherein said corresponding center wavelengths of said signal photons as received at said receiver are left unaltered; and

detecting in said receiver for each projected pulse whether said center wavelengths of said signal photons as received at said receiver have been altered, said step of detecting including projecting said series of signal photons through a nonlinear element and assessing a cumulative time distribution of said series of signal photons as output from said nonlinear element.

28. The method of claim 27 wherein said nonlinear element includes dispersive glass.

29. The method of claim 27 wherein said nonlinear crystal includes a Beta Barium Borate crystal.

30. The method of claim 27 wherein said down-conversion in said nonlinear crystal occurs via colinear, non-degenerate, type I phase-matching.

31. The method of claim 30 wherein said nonlinear crystal is a Beta Barium Borate crystal.

32. The method of claim 27 wherein said second photon has a frequency and wherein said collapse condition occurs when a measurement of said second photon frequency is made.

33. The method of claim 27 wherein said second photon has a frequency and wherein said atmosphere includes a transmitter wherein a measurement of said frequency is made.

34. The method of claim 33 wherein said frequency measurement includes using a spectrometer.

35. The method of claim 27 wherein said step of projecting a pulse of photons includes using a laser.

36. The method of claim 27 wherein purposeful alteration of said center wavelengths of said idler photons and a lack of purposeful alteration of said center wavelengths of said idler photons is used for communication.